



# SPEC® CINT2006 Result

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## Lenovo Group Limited

SPECint®\_rate2006 = 6580

Lenovo System x3950 X6  
(2.20 GHz, Intel Xeon E7-8880 v4)

SPECint\_rate\_base2006 = 6330

CPU2006 license: 9017

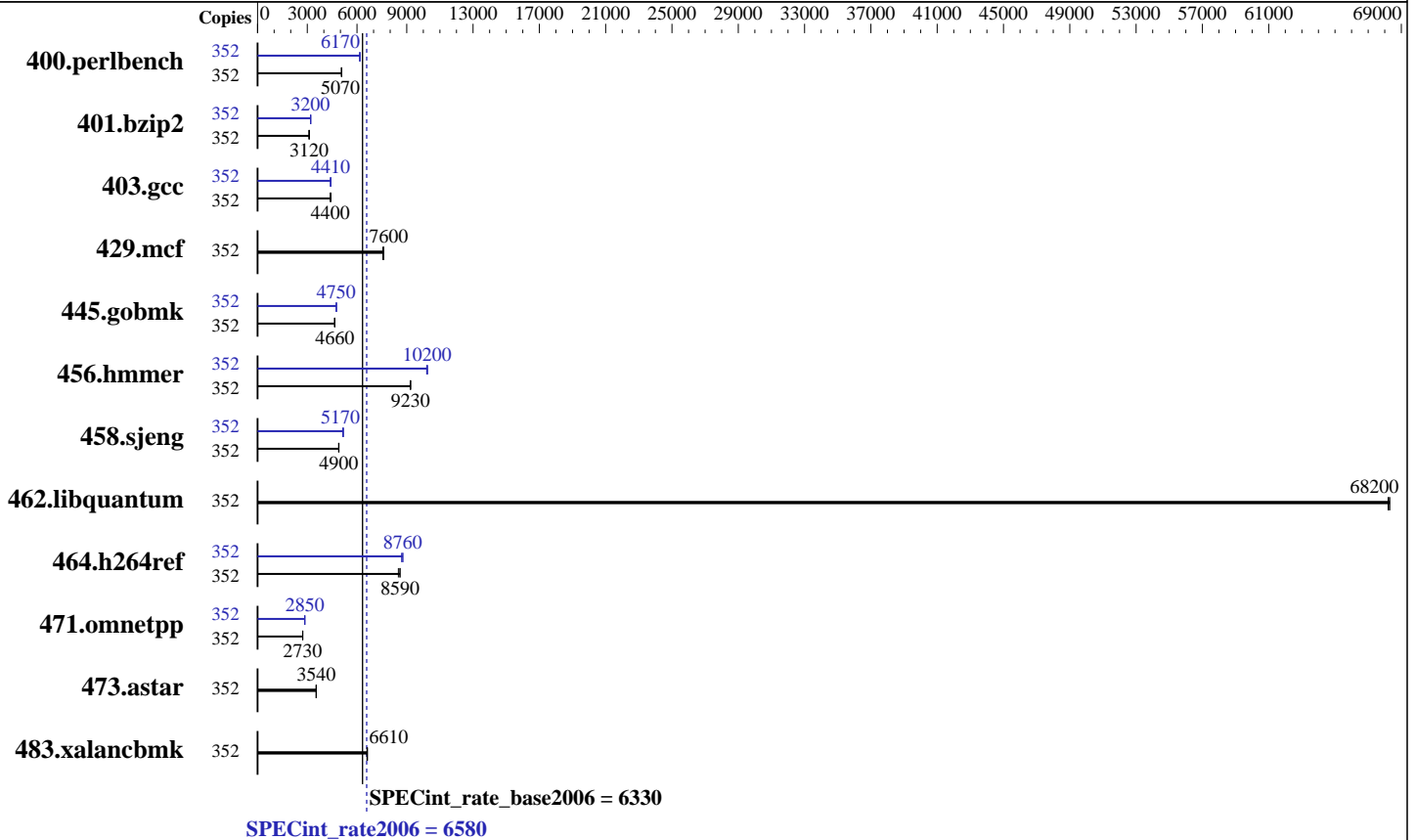
Test date: Jul-2016

Test sponsor: Lenovo Group Limited

Hardware Availability: Jun-2016

Tested by: Lenovo Group Limited

Software Availability: Mar-2016



### Hardware

CPU Name: Intel Xeon E7-8880 v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 176 cores, 8 chips, 22 cores/chip, 2 threads/core  
 CPU(s) orderable: 4,8 chips  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core  
 L3 Cache: 55 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 1 TB (64 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)  
 Disk Subsystem: 2 x 600 GB 15000 RPM SAS, RAID 1  
 Other Hardware: None

### Software

Operating System: SUSE Linux Enterprise Server 12 SP1 (x86\_64)  
 Kernel 3.12.49-11-default  
 Compiler: C/C++; Version 16.0.2.181 of Intel C++ Studio XE for Linux  
 Auto Parallel: No  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 32-bit  
 Peak Pointers: 32/64-bit  
 Other Software: Microquill SmartHeap V10.2



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## Results Table

Benchmark	Base						Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	352	681	5050	677	5080	<b>678</b>	<b>5070</b>	352	558	6160	<b>557</b>	<b>6170</b>	557	6180
401.bzip2	352	1096	3100	1087	3130	<b>1090</b>	<b>3120</b>	352	1062	3200	1057	3210	<b>1061</b>	<b>3200</b>
403.gcc	352	640	4430	<b>645</b>	<b>4400</b>	645	4390	352	<b>643</b>	<b>4410</b>	640	4430	645	4390
429.mcf	352	<b>422</b>	<b>7600</b>	425	7560	422	7610	352	<b>422</b>	<b>7600</b>	425	7560	422	7610
445.gobmk	352	796	4640	<b>792</b>	<b>4660</b>	791	4670	352	776	4760	777	4750	<b>777</b>	<b>4750</b>
456.hammer	352	355	9240	357	9210	<b>356</b>	<b>9230</b>	352	322	10200	320	10300	<b>321</b>	<b>10200</b>
458.sjeng	352	<b>869</b>	<b>4900</b>	871	4890	867	4910	352	822	5180	829	5140	<b>824</b>	<b>5170</b>
462.libquantum	352	107	68300	<b>107</b>	<b>68200</b>	107	68200	352	107	68300	<b>107</b>	<b>68200</b>	107	68200
464.h264ref	352	906	8590	917	8490	<b>907</b>	<b>8590</b>	352	889	8760	896	8690	<b>889</b>	<b>8760</b>
471.omnetpp	352	<b>807</b>	<b>2730</b>	808	2720	807	2730	352	<b>772</b>	<b>2850</b>	773	2850	771	2850
473.astar	352	699	3530	698	3540	<b>698</b>	<b>3540</b>	352	699	3530	698	3540	<b>698</b>	<b>3540</b>
483.xalancbmk	352	368	6610	<b>368</b>	<b>6610</b>	366	6630	352	368	6610	<b>368</b>	<b>6610</b>	366	6630

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"  
Transparent Huge Pages enabled with:  
echo always > /sys/kernel/mm/transparent\_hugepage/enabled  
Filesystem page cache cleared with:  
echo 1 > /proc/sys/vm/drop\_caches

## Platform Notes

BIOS Configuration:  
Operating Mode set to "Maximum Performance"  
Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914  
\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1  
running on X3950-01-SLES12SP1 Tue Jul 19 09:38:42 2016

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:  
<http://www.spec.org/cpu2006/Docs/config.html#sysinfo>

From /proc/cpuinfo  
model name : Intel(R) Xeon(R) CPU E7-8880 v4 @ 2.20GHz  
8 "physical id"s (chips)

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### Platform Notes (Continued)

352 "processors"  
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)

```

cpu cores : 22
siblings  : 44
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
physical 4: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
physical 5: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
physical 6: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28
physical 7: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
28

```

cache size : 56320 KB

From /proc/meminfo

```

MemTotal:      1058532360 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

From /etc/\*release\* /etc/\*version\*

```

SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 1
# This file is deprecated and will be removed in a future service pack or
release.
# Please check /etc/os-release for details about this release.

```

os-release:

```

NAME="SLES"
VERSION="12-SP1"
VERSION_ID="12.1"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp1"

```

uname -a:

```

Linux X3950-01-SLES12SP1 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC
2015 (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 Jul 19 09:35

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## Platform Notes (Continued)

SPEC is set to: /home/cpu2006-1.2-ic16.0

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda4	xfs	512G	6.7G	505G	2%	/home

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS IBM -[A9E135CUS-3.10]- 06/16/2016

Memory:

128x NO DIMM Unknown

64x Samsung M393A2G40DB0-CPB 16 GB 2 rank 2133 MHz, configured at 1600 MHz

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:

LD\_LIBRARY\_PATH = "/home/cpu2006-1.2-ic16.0/libs/32:/home/cpu2006-1.2-ic16.0/libs/64:/home/cpu2006-1.2-ic16.0/sh"

Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB memory using RedHat EL 7.2 glibc 2.17

Transparent Huge Pages enabled with:

echo always > /sys/kernel/mm/transparent\_hugepage/enabled

Filesystem page cache cleared with:

echo 1> /proc/sys/vm/drop\_caches

runspec command invoked through numactl i.e.:

numactl --interleave=all runspec <etc>

## Base Compiler Invocation

C benchmarks:

icc -m32 -L/opt/intel/compilers\_and\_libraries\_2016/linux/compiler/lib/ia32\_lin

C++ benchmarks:

icpc -m32 -L/opt/intel/compilers\_and\_libraries\_2016/linux/compiler/lib/ia32\_lin

## Base Portability Flags

400.perlbench: -D\_FILE\_OFFSET\_BITS=64 -DSPEC\_CPU\_LINUX\_IA32

401.bzip2: -D\_FILE\_OFFSET\_BITS=64

403.gcc: -D\_FILE\_OFFSET\_BITS=64

429.mcf: -D\_FILE\_OFFSET\_BITS=64

445.gobmk: -D\_FILE\_OFFSET\_BITS=64

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## Base Portability Flags (Continued)

```

456.hmmer: -D_FILE_OFFSET_BITS=64
458.sjeng: -D_FILE_OFFSET_BITS=64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -D_FILE_OFFSET_BITS=64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

```

## Base Optimization Flags

C benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-opt-mem-layout-trans=3

```

C++ benchmarks:

```

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-opt-mem-layout-trans=3 -Wl,-z,muldefs -L/sh -lsmartheap

```

## Base Other Flags

C benchmarks:

```

403.gcc: -Dalloca=_alloca

```

## Peak Compiler Invocation

C benchmarks (except as noted below):

```

icc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

```

```

400.perlbench: icc -m64

```

```

401.bzip2: icc -m64

```

```

456.hmmer: icc -m64

```

```

458.sjeng: icc -m64

```

C++ benchmarks:

```

icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

```



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## Peak Portability Flags

```

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64
403.gcc: -D_FILE_OFFSET_BITS=64
429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64
458.sjeng: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LP64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -D_FILE_OFFSET_BITS=64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

```

## Peak Optimization Flags

C benchmarks:

```

400.perlbench: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
               -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
               -par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32

401.bzip2: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
            -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
            -par-num-threads=1(pass 1) -prof-use(pass 2) -opt-prefetch
            -auto-ilp32 -ansi-alias

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div

429.mcf: basepeak = yes

445.gobmk: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
            -prof-use(pass 2) -par-num-threads=1(pass 1) -ansi-alias
            -opt-mem-layout-trans=3

456.hmmer: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32

458.sjeng: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
            -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
            -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4
            -auto-ilp32

462.libquantum: basepeak = yes

464.h264ref: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
              -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
              -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
              -ansi-alias

```

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## Peak Optimization Flags (Continued)

C++ benchmarks:

471.omnetpp: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -prof-use(pass 2) -ansi-alias  
-opt-ra-region-strategy=block -Wl,-z,muldefs  
-L/sh -lsmartheap

473.astar: basepeak = yes

483.xalancbmk: basepeak = yes

## Peak Other Flags

C benchmarks:

403.gcc: -Dalloca=\_alloca

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.html>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-B.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-B.xml>

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